

REMARKS

Claims 1, 3-7 and 13-16 were subject to examination in the outstanding Office Action. Claims 1, 3, 4 and 13-16 have been amended above. Applicants note with appreciation the indication in the Office Action that Claims 3 and 4 are objected to for being dependent from a rejected base claim, but are drawn to allowable subject matter. The remaining issues raised in the Office Action are discussed below.

As requested by the Examiner, a clean copy of the amended claim set is enclosed herewith.

I. Claim Amendments.

Claims 1, 3, 4 and 13-16 have been amended above. The amendments to the claims present no new matter and are supported by the application as filed.

Claim 1, subparagraph (b) has been amended to specifically recite the hybridization conditions. This is a clarifying amendment that does not change the scope of the claim; Claim 1 as originally filed recited "stringent" hybridization conditions, which term is defined by the specification in like manner as now set forth in the claims (at page 19, lines 14-24). Subparagraphs (b) and (d) have been amended to recite "wherein said nucleic acid encodes a protein that forms a complex with a cullin protein and/or has ubiquitin ligase activity." This recitation is supported throughout the application as filed including, page 44, lines 5-10, "By 'ROC protein activity' or grammatical equivalents herein is meant at least one of the ROC proteins' biological activities, including but not limited to, the proteins' ability to bind cullins (including, but not limited to, cullin 1, 2, 3, 4A and 5), its activity in ligating ubiquitin and the ubiquitin-dependent proteolytic process, its role in SICp degradation, and any other activity of ROC proteins as described herein, etc."

Claim 1 has also been amended to omit the word "sequence" where objected to in the Office Action and to make other minor amendments to clarify the claimed subject matter.

Claims 3, 4, 6 and 7 have also been amended to clarify the claim language.

Claim 13 has been amended to delete the language "and having a length sufficient to hybridize thereto under physiological conditions." In addition, Claim 13 now specifically recites that the antisense oligonucleotide is "8 to 50 nucleotides in length." This amendment is supported by the specification at page 36, lines 17-19, which recites: "In general, the antisense oligonucleotide will be from 8, 10 or 12 nucleotides in length up to 20, 30, or 50 nucleotides in length." Claim 13 has further been amended to recite that the antisense oligonucleotide is "completely complementary to a portion of the nucleic acid."

Claims 14 and 15 have been amended to clarify the claimed subject matter.

Claim 16 has been amended to recite that the polynucleotide comprises a nucleic acid (i) having the nucleotide sequence of SEQ ID NO:1, (ii) a degenerate sequence thereof, or (iii) a segment of at least 60 nucleotides of the nucleic acids of (i) or (ii). The recitations of (i) and (ii) are supported by the application as filed (e.g., originally filed Claim 1). The recitation of "at least 60 nucleotides" is supported by the specification at page 17, lines 20-22, which recites "'Fragments' are those nucleic acid sequences which are greater than 60 nucleotides in length . . ."

In sum, Applicants submit that the claim amendments do not present new matter, and respectfully request entry thereof.

II. Restriction Requirement.

In the Office Action, the Restriction Requirement has been made final. Applicants respectfully request reconsideration of the Restriction Requirement for the reasons set forth in Applicants' response of March 21, 2003.

III. Priority Claim.

The Office Action acknowledges the claims for domestic priority from U.S. Provisional Application No. 60/127,261 filed on March 31, 1999. Applicants respectfully note that this application is entitled to a second priority claim from U.S. Provisional Application No. 60/166,927 filed November 22, 1999. Both priority

claims are indicated in the first paragraph of the specification and on the application transmittal form. As indicated below, Applicants are in the process of obtaining a new declaration to correct the typographical error in listing the priority information therein.

IV. Declaration.

The Office Action states that the declaration is defective on the basis that "while the first paragraph of the specification claims priority to provisional application No. 60/166,127 filed 11/22/1999, the declaration claims priority to unrelated provisional application No. 60/133,927."

Applicants appreciate the Examiner's careful review of the application documents. Applicants note that the first paragraph of the specification indicates that priority is claimed from both Provisional Application No. 60/127,261 and 60/166,927. The priority claim listed in the declaration to Provisional Application No. 60/133,927 is incorrect. Applicants are in the process of obtaining a corrected declaration, which will be submitted shortly.

V. Drawings.

The draftsman has raised certain objections to the drawings. Applicants are submitting herewith a new set of formal drawings for Figures 1-6.

VI. Claim Objections.

Claims 1, 3, 13 and 16 stand objected to on various grounds. The individual objections are addressed below.

Claims 1, 3 and 13 stand objected to for reciting the term "ROC1" on the basis that this term is an undefined abbreviation. Applicants respectfully disagree with this objection. "ROC1" is the name of the protein; it is not an abbreviation. Although the name is derived from the term "Regulator of Cullins," the name of the protein is ROC1.

Claim 13 is objected to for reciting "oligonucleotide complementary to the nucleic acid sequence encoding" Although, as discussed below, Applicants disagree with this objection, Claim 13 has been amended as suggested by the Examiner to recite "oligonucleotide complementary to the nucleic acid encoding"

Claim 16 is also objected to for reciting a "nucleic acid sequence". Applicants have amended Claim 16 to recite a "nucleic acid" as suggested by the Examiner.

In view of the foregoing comments and amendments, Applicants request that the outstanding objections to the claims be withdrawn.

VII. Claim Rejections under § 112, Second Paragraph.

Claims 1, 5-7, and 13-16 stand rejected under 35 U.S.C. § 112, second paragraph, on various grounds of indefiniteness. The individual rejections are addressed below.

Claim 1 (and dependent Claims 5-7) is allegedly indefinite for recitation of "sequence that hybridizes to the nucleic acid sequence" on two separate grounds. First, the Office Action states that "it is unclear as to how a sequence can hybridize to another sequence since as known in the art, hybridization occurs among nucleic acid molecules. A sequence is a graphical representation of the order in which nucleotides/amino acids are arranged in a molecule." (Office Action, paragraph 10). Applicants respectfully disagree. The claim preamble states that the claimed subject matter is a "polynucleotide," which is a compound and not a graphical representation. Further, although the term "nucleic acid sequence" is often used to refer to the graphical representation of the order of the nucleotides within the molecule, it is accepted both in the art and the patent literature to use "nucleic acid sequence" to refer to the molecule itself. Applicants respectfully point to issued U.S. Patent Nos. 6,323,020 (reciting "nucleotide sequence") and 6,365,402 (reciting "nucleic acid sequence"). Finally, the outstanding rejection is contrary to the policy set forth in the January 17, 2003 Memorandum from Stephen G. Kunin, Deputy

Commission for Patent Examination Policy¹ as the claim language presented satisfies the notice function of §112, second paragraph.

Nonetheless, to expedite the prosecution of the present application to allowance in accordance with the USPTO Patent Business Goals (65 Fed. Reg. 54603, September 8, 2000), Claims 1, 3, 4, 13 and 16 have been amended to recite a "nucleic acid" rather than a "nucleic acid sequence." Applicants note for the record that this amendment does not change the scope of the claims.

Furthermore, Claim 1 (as well as dependents 5-7) stands rejected as indefinite for reciting "stringent conditions" without setting forth specific hybridization conditions. Applicants respectfully point out that "stringent conditions" for hybridization are specifically and explicitly defined in the specification at page 19, lines 14-24. To expedite the prosecution of this application, Applicants have amended Claim 1 to specifically recite "stringent conditions defined by a wash of 50% Formamide, 5X Denhardt's solution, 0.5% SDS and 1X SSPE at 42°C" as set forth in the specification. Applicants note that this amendment does not alter the claims scope, but merely clarifies the features of the originally claimed subject matter.

Claim 13 (and dependent Claims 14 and 15) stands rejected as indefinite for reciting the terms "length sufficient," "hybridize," and "physiological conditions." Claim 13 has been amended herein and, as amended, no longer contains any of these claim terms.

The Office Action further states with respect to Claim 13 that "[f]or examination purposes, the claim will be interpreted as being drawn to a polynucleotide which comprises any fragment of the complete complement of the polynucleotide of SEQ ID NO:1." Applicants respectfully note for the record that the oligonucleotides of Claim 13 are completely complementary to any fragment of 8-50

¹ Memorandum of January 17, 2003, entitled "Advance notice of changes to MPEP § 2173.02 clarifying Office policy with respect to rejections made under 35 U.S.C. § 112, second paragraph in view of the Supreme Court holding in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 122 S.Ct. 1831, 62 USPQ2d 1705 (2002).

nucleotides of the nucleic acids of Claim 1, which encompass more than the specific nucleotide sequence of SEQ ID NO:1.

Claim 14 also stands rejected as indefinite, the Office Action stating that it is unclear what is being claimed. Claim 14 has been amended as suggested by the Examiner.

In view of the foregoing discussion, the Applicants submit that the claims satisfy the requirements of 35 U.S.C. § 112, second paragraph, and respectfully request withdrawal of the rejections on this basis.

VIII. Written Description.

Claims 1, 5-7, and 13-16 stand rejected under 35 U.S.C. §112, first paragraph, the Office Action stating that the claims encompass subject matter which was not described in the specification in such a way so as to reasonably convey that the inventors had possession of the claimed invention. This rejection is addressed below.

Claim 1 has been amended to recite specific hybridization conditions and to recite that the claimed polynucleotides share common functional properties. Thus, Claim 1 is drawn to a genus of polynucleotides sharing close structural and functional properties. Claim 1 has been amended in conformity with the Revised Interim Written Description Training Examples (*hereinafter*, the "Training Examples"). Specifically, Example 9 ("Hybridization") of the Training Examples discusses the adequacy of the written description of a claim reciting:

An isolated nucleic acid that specifically hybridizes under highly stringent conditions to the complement of the sequence set forth in SEQ ID NO:1, wherein said nucleic acid encodes a protein that binds to a dopamine receptor and stimulates adenylate cyclase activity.

The commentary accompanying this Example states:

[T]urning to the genus analysis, a person of skill in the art would not

expect substantial variation among species encompassed within the scope of the claims because the highly stringent hybridization conditions set forth in the claim yield structurally similar DNAs. Thus, a representative number of species is disclosed, since highly stringent hybridization conditions in combination with the coding function of DNA and the level of skill and knowledge in the art are adequate to determine that applicant was in possession of the claimed invention.

The Training Examples conclude that the claim is "adequately described".

Likewise, Applicants submit that the recited polynucleotides of Claim 1 find sufficient written support in the specification and satisfy the written description requirement of 35 U.S.C. § 112, first paragraph, as Claim 1 recites "structurally similar" nucleic acids.

With respect to Claims 13-16, Applicants are somewhat unclear as to the specific reasoning underlying this particular rejection. Applicants note that these claims have also been amended to recite a genus of nucleic acids with a close structural and functional relationship. Claim 13 has been amended to recite an antisense oligonucleotide that is "8 to 50 nucleotides in length" and which is "completely complementary" to a fragment of the nucleic acids encoding ROC1 of Claim 1. Likewise, Claim 16 recites a nucleic acid encoding a ROC1 protein or fragment thereof having (i) sequence of SEQ ID NO:1, (ii) a degenerate sequence therefrom, or (iii) a segment of at least 60 nucleotides of either of (i) or (ii). As described in the specification at page 13 (lines 13-14), fragments of ROC1 "retain[] the biological activity or the immunological activity" of ROC1. Thus, Claims 1, 13 and 16 (and dependent Claims 5-7 and 14-15) each recite a genus of structurally and functionally related molecules, and the specification provides adequate written support for the genus of molecules encompassed by Claims 13-16.

In summary, in view of the foregoing, Applicants submit that the specification as filed provides adequate written support for the subject matter 1, 5-7 and 13-16. Accordingly, Applicants respectfully request that the rejection on this basis is withdrawn.

IX. Enablement.

Claims 1, 5-7 and 13-16 stand rejected under 35 U.S.C. §112, first paragraph, on the basis that although the specification is enabling for the polynucleotide of SEQ ID NO:1 and the protein of SEQ ID NO:2, it is not enabling for polynucleotides that hybridize to SEQ ID NO:1 under any conditions and which have any function, and which further encode proteins of any function.

Applicants believe that the amendments to Claims 1, 13 and 16, discussed in more detail in the previous section, moot these concerns. The claims have been amended to recite structurally and functionally related molecules, and one skilled in the art can practice the claimed invention using no more than routine skill based on the guidance in the specification and the knowledge in the art.

Accordingly, the Applicants submit that Claims 1, 5-7 and 13-16 are enabled and respectfully request that the outstanding enablement rejection be withdrawn.

X. Art Rejections.

The claims stand rejected under 35 U.S.C. §102 or § 103(a) over Okresz (Accession No. AY052401), Arino et al., (Accession No. CAA99155) and/or statements in Applicants' specification. These rejections are addressed below.

Claim 1 stands rejected as anticipated under § 102(a) by statements in the Applicants' specification. In Paragraph 16, the Office Action states that Applicants have asserted at page 57 (Example 8) that an Arabidopsis gene coding for a ROC1 protein was found by Applicants and an alignment of 82 out of 108 amino acids of the human ROC1 protein with the Arabidopsis protein indicated 98% amino acid sequence identity. The Office Action further states that Okresz discloses an Arabidopsis protein having 118 amino acids and comprising the human ROC1 fragment in Figure 2C of the specification. Applicants note that Okresz is not prior art with respect to the present application. It appears that Okresz is being cited as describing a nucleic acid that corresponds to the protein in Figure 2C of the

specification.

Applicants respectfully note that the claims are drawn to polynucleotides and methods of using the same. As indicated by the alignments provided with the Office Action, the Arabidopsis nucleic acid deposited by Okresz shares only 52.9% nucleotide sequence identity with the nucleotide sequence of SEQ ID NO:1. Applicants' specification does not disclose any Arabidopsis nucleic acid sequence corresponding to the amino acid sequence in Figure 2C. Claim 1 is directed to polynucleotides comprising (a) a nucleic acid consisting of the nucleotide sequence of SEQ ID NO:1; (b) nucleic acids that hybridize to the complement of SEQ ID NO:1 under high stringency conditions; (c) degenerate nucleic acids of (a) or (b); and (d) nucleic acids having at least 95% sequence identity to SEQ ID NO:1. Thus, the claimed polynucleotides of Claim 1 do not encompass the Arabidopsis nucleic acid of Okresz.

Claims 1, 13 and 14 stand rejected under 35 U.S.C. §102(b) as anticipated by Arino et al. (GenBank Accession Number CAA99155) on the basis that Arino et al. discloses a yeast polynucleotide with an ORF labeled YOL133w that, according to the specification at page 62 (Example 12) has ROC1 activity. The Office Action further states that the yeast polynucleotide shares 67% sequence identity with the human ROC1 nucleic acid sequence of SEQ ID NO:1. The Office Action concludes that the polynucleotide of Arino et al. would hybridize to SEQ ID NO:1 under any hybridization conditions. First, Applicants note that the statement in the specification refers to Figure 2C and is discussing amino acid sequence identity. As shown in the alignment provided by the Examiner, the polynucleotide sequence deposited by Arino et al. has only 37.8% nucleotide sequence identity with SEQ ID NO:1. Thus, Claim 1 (and dependent Claims 13 and 14) does not encompass the polynucleotide described by Arino et al.

Claims 5-7, 15 and 16 stand rejected under §103(a) for obviousness over Arino et al. Claims 5-7 and 15 ultimately depend from Claim 1. As discussed above, the recitations of Claim 1 exclude the nucleic acid of Okresz. Applicants are

In re: Xiong et al.
Serial No.: 09/541,462
Filed: March 31, 2000
Page 14 of 14

somewhat unclear regarding the nature of the rejection of Claim 16. Claim 16 currently recites polynucleotides (i) having the nucleotide sequence of SEQ ID NO:1, (ii) degenerate sequences thereof, as well (iii) as segments of at least 60 nucleotides of (i) and (ii). The recited polynucleotides do not encompass the yeast nucleic acid of Arino et al.


Finally, the Examiner points to Kamura et al. Applicants note that this reference is not prior art with respect to the present application.

In view of the foregoing, Applicants submit that the claimed subject matter is both novel and nonobvious over the cited references, and respectfully request withdrawal of the rejections under §102 and §103(a).

XI. Conclusions.

The concerns of the Examiner having been addressed in full, Applicants respectfully request withdrawal of all outstanding rejections and the issuance of a Notice of Allowance forthwith. The Examiner is encouraged to address any questions regarding the foregoing to the undersigned attorney, who may be reached at (919) 854-1400.

Respectfully submitted,



Karen A. Magri
Registration No. 41,965


cc: Clean copy of amended claims

Customer Number 20792
Myers Bigel Sibley & Sajovec
Post Office Box 37428
Raleigh, NC 27627

Telephone: (919) 854-1400
Facsimile: (919) 854-1401

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on August 6, 2003.


Sloan Smith